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PATENT

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In re Application of: Bradley et al.

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Filed: September 22, 2000

Docket No.: 125/116

Confirmation No.: 1535

For: CORROSION INHIBITING FORMULATION

**Commissioner for Patents
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Alexandria, VA 22313-1450**

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Attached please find the certified copy of the foreign application from which priority is claimed for this case:

Country: UK

Application Number: 9924358.6

Filing Date: 10/14/1999

Date: May 25, 2005

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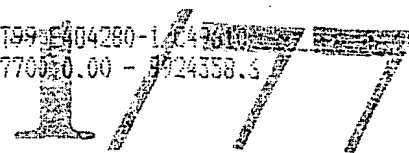
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9924358.6

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3. Full name, address and postcode of the or of each applicant (*underline all surnames*)

Brad - Chem Technology Ltd.

Unit C4 (4)

Moss Industrial Estate

Leigh

Lancashire, WN7 3PT

U.K. Company

77 60614001 14

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4. Title of the invention

Corrosion Inhibiting Compositions

5. Name of your agent (*if you have one*)

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Number of earlier application

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Date

A. Brady

10 October, 1999

12. Name and daytime telephone number of person to contact in the United Kingdom

Arthur Brady, 01942 261 024

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CORROSION INHIBITING COMPOSITIONS

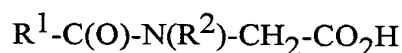
Description

The present invention relates to corrosion-inhibiting and/or lubricant compositions comprising an organic hydrocarbon and/or water-based system containing an effective amount of a mixture of an acyl amino acid derivative and a triazole derivative.

The compositions find utility in a wide range of industrial oil, fuel, water, emulsion-based and surface coating systems where corrosion protection of a range of one or more metals is required.

Background of the Invention

A wide variety of additives have been developed and are in commercial use for the protection of metals against corrosion in organic and aqueous media. Amongst ferrous metal corrosion inhibitors, carboxylic acids are widely used, for example, those with long chain alkyl or aryl groups which impart solubility in organic systems, for example hydrocarbon oils. Particularly effective compounds are acyl amino acids of structure (I) :

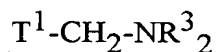


(I)

where R^1 is a long chain alkyl group and R^2 is hydrogen or methyl.

Where water solubility is required, it is common practice to employ a water-soluble salt of the carboxylic acid, for example, a sodium salt or a trialkanolamine salt.

Amongst non-ferrous metal passivators (or deactivators), the most widely used compounds for protection of copper and copper alloys are triazole derivatives, particularly benzotriazole or tolutriazole. As above, derivatives are well known which enhance solubility in organic hydrocarbons or water. For example structures of formula (II) are in commercial use :



(II)

where T^1 is a triazole derivative, R^3 is hydroxyalkyl (for water solubility) or alkyl (for oil solubility).

When ferrous metal corrosion inhibition and non ferrous metal passivation are both required in an oil-based medium an oil-soluble corrosion inhibitor is used with an oil-soluble metal passivator. Similarly, when both ferrous metal corrosion inhibition and non ferrous metal passivation are required in an aqueous medium, a water-soluble corrosion inhibitor is used together with a water-soluble metal passivator.

However, in a number of applications, solubility in both organic hydrocarbons and water is desirable. Such applications include, but are not limited to, those involving emulsions or those where water may be present as a contaminant of oil systems. Applications where dual solubility would be of utility include, but are not limited to, industrial oils, crankcase lubricants, metalworking fluids, hydraulic fluids, rolling oils, brake fluids, fuel systems, surface coatings and water-soluble paints.

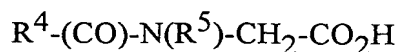
In an effort to reduce the amount of organic hydrocarbon material used in many technologies, aqueous emulsion formulations are being developed so that the range of technical areas in which emulsions will have importance is increasing. However, use of the conventional compounds described above generally results in either organic hydrocarbon solubility or water solubility. To date it has not been possible to produce an effective corrosion inhibitor/metal passivator formulation for multi-metal protection which is soluble in both organic hydrocarbons and water.

Surprisingly we have now found that mixtures from organic hydrocarbon-soluble ferrous metal corrosion inhibitors of formula (III) and water-soluble metal passivators of formula (IV) in particular ratios are soluble in both oil and water and give corrosion protection to a range of metals.

Invention

Accordingly, the invention provides a mixture comprising one or more compounds of type:

- a) an organic hydrocarbon-soluble acyl amino acid derivative of the formula (III):



(III)

in which

R^4 is $C_8 - C_{30}$ straight or branched chain alkyl, optionally substituted by one or more aryl or alkenyl groups. Preferably R^4 is $C_{10} - C_{20}$ alkyl, more preferably $C_{11} - C_{17}$ alkyl.

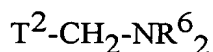
Especially preferred R^4 groups are $C_{11}H_{23}$ derived from lauric acid and $C_{17}H_{33}$ derived from oleic acid.

R^5 is hydrogen or methyl, preferably methyl,

and

one or more compounds of type:

b) a water-soluble N,N disubstituted aminomethyl triazole derivative of formula (IV):



(IV)

in which

T^2 is a 1,2,3, benzotriazole group, optionally substituted by one or more alkyl groups, or a 1,2,4 triazole group. Preferably, T^2 is a 1,2,3, benzotriazole group, optionally substituted by one or more alkyl groups. More preferably, T^2 is benzotriazole or tolutriazole.

R^6 is a hydroxyalkyl group containing from 1 - 4 carbon atoms and from 1 - 4 hydroxyl groups. Preferably R^6 is 2-hydroxyethyl or hydroxypropyl, most preferably 2-hydroxyethyl,

in such a ratio such that the resulting combination is soluble in both organic hydrocarbons and water.

Especially preferred mixtures are those from combination of N-oleoyl sarcosine and bis (2-hydroxyethyl) amino methyl tolutriazole, N-oleoyl sarcosine and bis (2-hydroxyethyl) amino methyl benzotriazole, N-lauroyl sarcosine and bis (2-hydroxyethyl) amino methyl tolutriazole and N-lauroyl sarcosine and (2-hydroxyethyl) amino methyl benzotriazole.

The invention further provides a mixture of compounds (III) and (IV) present in a particular ratio to each other in water, organic hydrocarbons, or a mixture of water and organic hydrocarbons.

Organic hydrocarbons include natural or synthetic aliphatic or aromatic compounds of carbon and hydrogen, optionally containing unsaturated linkages, ester groups or hetero atoms e.g. oxygen. Non-limiting examples are:

octane, kerosine, white spirit, petroleum-based hydrocarbons such as naphthenic oils or paraffinic oils, vegetable oils, synthetic carboxylic acid esters, phosphate esters, poly α olefins, poly isobutylenes, alkylated aromatic hydrocarbons, ethylene glycol, propylene glycol, polyalkylene glycols, glycol ethers.

Water used in the formulations may be distilled water, de-ionised water or natural water.

The optimum ratio of compounds (III) and compounds (IV) will depend on the degree of solubility required. For example, higher levels of compound (III) will increase solubility in organic hydrocarbons, higher levels of compound (IV) will increase solubility in water. Typically the mole ratio of compound (III) to compound (IV) is between 1 : 0.2 and 1 : 2, preferably between 1 : 0.5 and 1 : 1, more preferably between 1 : 0.6 and 1 : 0.9.

The invention further provides a mixture of compounds (III) and (IV) present in water or organic hydrocarbon, or a mixture of the two in contact with a ferrous metal surface, a non-ferrous metal surface, or a combination of such surfaces. Non-limiting examples of metals are:

iron, copper, aluminium, magnesium, zinc, cobalt, tin and alloys comprising these materials.

The invention further provides a kit which comprises compound (III) and compound (IV) in such a ratio that, when mixed together, the resulting combination is soluble in both water and organic hydrocarbons.

The invention further provides the process of mixing together one or more compounds of formula (III) with one or more compounds of formula (IV) in a ratio such that the resulting mixture is soluble in water and organic hydrocarbons.

The process typically involves mixing the components in the required ratio and stirring at elevated temperature. Temperatures from room temperature to 100°C may be employed but preferably the temperature is kept below 50°C. Mixing times may vary from a few minutes to several hours but are typically 10 - 30 minutes. A solvent such as water or an organic hydrocarbon solvent may optionally be employed.

The invention further provides the use of a mixture of compounds (III) and (IV) as defined above as a corrosion inhibitor, or as a rust inhibitor, or as a metal passivator, or as a metal deactivator, or as a multipurpose additive for a combination of the afore mentioned purposes.

A further feature of the invention is that the mixtures of compounds (III) and compounds (IV) described show good properties as emulsifiers and surfactants.

The term 'soluble' used in relation to the invention is taken herein to indicate that the compound is soluble at a concentration sufficient to be effective in inhibiting corrosion or passivating metal as the case may be. The effective level of mixtures of the invention will vary depending on the application but, typically, levels of between 10ppm and 5% by weight may be used, preferably between 0.05% and 2%.

Non limiting applications of the present invention include:

hydrocarbon, synthetic and water-based hydraulic fluids, gear oils, chain oils, circulating oils, turbine oils, crankcase oils, compressor oils, bearing lubricants, wire drawing lubricants, soluble oils, oil-based metalworking fluids, metalworking fluid emulsions, grinding fluids, heat transfer oils, electrical insulating oils, greases, brake fluids, fuels, engine coolants, refrigeration lubricants, surface cleaners, fountain solutions, aircraft de-icing fluids, de-watering fluids, penetrating fluids, polishes, adhesives, water-based paints, industrial cooling water systems and solutions used in the electronics industry for printed circuit board manufacture.

In order to improve various applicational properties, aqueous or organic hydrocarbon formulation in accordance with the invention may also contain other additives. Non-limiting examples of other additives are:

Phenolic or aminic antioxidants, further corrosion or rust inhibitors, further metal deactivators, extreme pressure/antiwear additives, viscosity index improvers, pour point depressants, dispersants/surfactants, antifoams, biocides, complexing agents.

Non-limiting examples of phenolic antioxidants are:

2,6 di-t-butyl phenol derivatives, 2 t-butyl 6 methyl phenol derivatives.

Non-limiting examples of aminic antioxidants are:

alkylated diphenylamine derivatives and alkylated a-naphthylamine derivatives.

Non-limiting examples of corrosion inhibitors/rust inhibitors are:

alkyl or aryl mono, di or poly carboxylic acids and their ammonium, amine alkanolamine or metal salts, alkenyl succinic acid and derivatives, aryl sulphonic acid salts, phosphoric acid, polyphosphoric acids and derivatives, phosphonic acids, fatty acid alkanolamides, imidazoline derivatives.

Non-limiting examples of metal de-activators are:

1,2,4 triazole derivatives, benzotriazole and alkylated benzotriazole derivatives, mercaptobenzothiazole and its sodium salt.

Non-limiting examples of extreme pressure/antiwear additives are:

zinc dialkyl dithiophosphates, amine salts of substituted phosphoric acid derivatives, triphenyl phosphorothioate and alkylated derivatives, molybdenum dithiocarbamate derivatives, tri-aryl phosphates, sulphurised hydrocarbons e.g. vegetable oils..

Non limiting examples of viscosity index improvers/pour point depressants are:

polyacrylates, polymethacrylates, olefin co-polymers, styrene-acrylate co-polymers, alkylated naphthalene derivatives.

Non-limiting examples of dispersants/surfactants are:

polybutenyl succinic acid amides, basic magnesium, calcium and barium sulphonates and phenolates.

Non-limiting examples of antifoams are:

polysiloxanes, ethylene/propylene oxide co-polymers.

Non limiting examples of biocides are:

isothiazolone derivatives, boron amide derivatives.

Non-limiting examples of complexing agents are:

ethylene diamine tetra-acetic acid and derivatives, citric acid.

Compounds (III) and compounds (IV) described in the invention are commercially-available or may be prepared by methods described in the scientific literature. For example, compounds (III) may be prepared by reaction of an appropriate acyl chloride with an appropriate amino acid. Compounds (IV) may be prepared by reacting an appropriate triazole derivative with formaldehyde and a hydroxyl-containing secondary amine by the Mannich reaction.

The following examples further illustrate, but do not limit, the present invention. Unless otherwise indicated, parts and percentages are by weight.

Examples 1 - 15

Details of preparation of Examples 1 - 15 of the invention are given in Table 1.

Mixtures are prepared by mixing the appropriate amounts of compounds of type (III) and compounds of type (IV) in a 100ml glass conical flask and warming at 40 - 50 °C, with stirring, for approx. 15 minutes.

Triazole derivative A is a water-soluble commercial mixture containing bis (hydroxyethyl) aminomethyl tolutriazole isomers, sold by Ciba Specialty Chemicals under the trade name Irgamet 42 (RTM).

Triazole derivative B is as above, with water removed by vacuum stripping up to 50°C.

Example 16

9.33 parts of water-soluble triazole derivative A are dissolved in 150 parts of de-ionised water and the solution warmed to 40°C, with stirring in a 250ml beaker. 14.13 parts of N-oleoyl sarcosine are then added over approx. 10 minutes. The mixture is stirred at 40°C for a further 10 minutes and allowed to cool. The resulting product is a clear, pale yellow solution containing 13.5% solids.

Example 17

10.09 parts of N-oleoyl sarcosine are dissolved in 150 parts of toluene and the solution warmed to 40°C, with stirring in a 250ml beaker. 5.0 parts triazole derivative A are then added over approx 10 minutes. The mixture is stirred at 40°C for a further 10 minutes and allowed to cool. The resulting product is a clear, pale yellow solution containing 9.1 % solids.

Comparative Examples 18- 22

Details of preparation of Comparative Examples 17 - 22 are given in Table 2

Products are prepared by mixing the appropriate amounts of carboxylic acid and base in a 100ml glass conical flask and warming at 40 - 50 °C, with stirring, for approx. 15 minutes.

Solubility Testing

Details of solubility testing of mixtures of the invention, together with comparative examples, in water and a naphthenic oil, are shown in Table 3. Details of solubility testing in other solvents are shown in Table 4.

Solubilities are determined by preparing a range of concentrations of product in solvent, e.g. 0.5%, 1.0%, 5.0%, 20% and warming the mixtures, with stirring at 40 - 50°C, for approx. 15 minutes. Mixtures are allowed to stand overnight at room temperature and visually inspected to see if complete solution has occurred. Solubilities described at > 1.0% mean that 1.0% solutions are completely soluble. Solubilities described as < 1.0% mean that 1.0% solutions are not completely soluble.

Examination of Tables 3 and 4 show that mixtures of the invention show solubility in solvents with polarity ranging from water to paraffinic mineral oil. Comparative examples where either compound (III) or compound (IV) is replaced by closely related compounds outside the invention do not show dual solubility, being soluble either in organic hydrocarbon or water, or neither, but not both.

Corrosion Inhibitor/Metal Passivator Testing

Details of testing of mixtures of the invention for corrosion inhibition and metal passivation are given in Table 5. Details of test methods are given below.

Ferrous metal corrosion testing

(i) Coupon Test

A 70mm x 40mm mild steel test coupon is cleaned by polishing with silicon carbide abrasive paper and degreased by immersion in toluene for one hour. The coupon is dried in the oven at 90°C. The clean, dry coupon is placed in a 100ml beaker containing 50ml of test solution comprising 0.2% mixture of the example in de-ionised water. The beaker is covered with a petri dish and placed in a water bath at 90°C for 1 hour. The coupon is then removed, allowed to dry at room temperature and inspected for signs of corrosion or staining. Examples where the coupons show visual signs of corrosion or staining are not considered effective corrosion inhibitors.

Examination of Table 5 shows that test solutions containing mixtures of the invention give coupons with no change over the initial clean and polished coupons. By comparison, a blank test with de-ionised water gives a coupon with severe staining and corrosion showing that mixtures of the invention have corrosion inhibitor properties for mild steel.

(ii) IP 287 Test (Institute of Petroleum Test Designation IP 287/82)

This method measures the rust prevention characteristics of aqueous solutions or emulsions by the chip/filter paper method. Cast iron chips are washed with acetone and dried in the oven at 105°C. The chips are sieved onto a filter paper placed in a petri dish so as to cover a 35mm square with a single layer. 2ml of test solution prepared by dissolving the mixture of the example in synthetic hard water (0.3449 g/l calcium sulphate dihydrate in distilled water) is then pipetted onto the chips so that they are all thoroughly wetted. The dish is covered with a lid and allowed to stand at room temperature for 2 hours. The filter paper is then removed, washed with water and allowed to dry. The area of staining on the paper is assessed. The test is repeated at various dilutions to determine the point where there is significant increase in stained area. This dilution is known as the break point and is expressed as the dilution (ratio of water to product) at the break point.

Examination of Table 5 shows that the mixture of Example 3 gives a break point of 30 : 1 proving that the mixture has rust inhibiting properties for cast iron.

Aluminium corrosion testing

A 70mm x 40mm aluminium test coupon is cleaned by immersion in toluene for one hour and then dried in the oven at 90°C. The clean, dry coupon is placed in a 100ml beaker containing 50ml of test solution comprising 0.2% mixture of the invention in de-ionised water. The beaker is covered with a petri dish and placed in a water bath at 90°C for 20 minutes. The coupon is then removed, allowed to dry at room temperature and inspected for signs of corrosion or staining. Examples where the coupons show visual signs of corrosion or staining are not considered effective corrosion inhibitors.

Examination of Table 5 shows that test solutions containing mixtures of the invention give coupons with no change over the initial clean and polished coupons. By comparison, a blank test with de-ionised water gives a coupon with severe staining and corrosion showing that mixtures of the invention show corrosion inhibitor properties for aluminium.

Copper passivation testing

Copper Strip Tarnish Test ASTM D 130 - 75

The test is designed to measure the corrosiveness to copper of hydrocarbons. Details are given in the Annual Book of ASTM Standards published by the American Society for Testing and Materials. A clean, dry copper strip is placed in 30ml test solution comprising 0.1% mixture of the example in mineral oil containing 100ppm polysulphide and heated for 3 hours at 100°C. Results are determined by comparison with the ASTM Copper Strip Corrosion Standards and giving the appropriate classification.

Examination of Table 5 shows that the mixture of Example 3 has a 1a classification in both of the mineral oils tested compared with blank ratings of 3b for the mineral oils (containing polysulphide) alone, showing the mixture to be a corrosion inhibitor/passivator for copper.

The results in Table 5 show that mixtures of the invention show activity as corrosion inhibitors and metal passivators for ferrous metals, aluminium and copper, both in aqueous and non-aqueous systems.

Table 1 **Examples of Mixtures of the Invention**

Example No.	Compound Type (III)	Parts of (III)	Compound Type (IV)	Parts of (IV)	Mole Ratio (III) / (IV)
1	N-oleoyl sarcosine	10.59	Triazole Derivative A	6	1 : 0.6
2	N-oleoyl sarcosine	10.69	Triazole Derivative A	6.57	1 : 0.65
3	N-oleoyl sarcosine	14.13	Triazole Derivative A	9.33	1 : 0.7
4	N-oleoyl sarcosine	10.59	Triazole Derivative A	6.57	1 : 0.75
5	N-oleoyl sarcosine	7.06	Triazole Derivative A	5.33	1 : 0.8
6	N-oleoyl sarcosine	10.59	Triazole Derivative A	8.49	1 : 0.85
7	N-oleoyl sarcosine	7.07	Triazole Derivative A	6	1 : 0.9
8	N-oleoyl sarcosine	10.09	Triazole Derivative B	5	1 : 0.7
9	N-oleoyl sarcosine	9.2	Triazole Derivative B	5.21	1 : 0.8
10	N-oleoyl sarcosine	12.09	Triazole Derivative B	7.28	1 : 0.85
11	N-oleoyl sarcosine	7.85	Triazole Derivative B	5	1 : 0.9
12	N-lauroyl sarcosine	5.42	Triazole Derivative A	4.66	1 : 0.7
13	N-lauroyl sarcosine	5.42	Triazole Derivative A	6.66	1 : 1
14	N-lauroyl sarcosine	10.84	Triazole Derivative B	7	1 : 0.7
15	N-lauroyl sarcosine	5.71	Triazole Derivative B	5.26	1 : 1

Table 2 **Comparative Examples**

Example No.	Carboxylic Acid	Parts of Acid	Base	Parts of Base	Mole Ratio Acid/ Base
18	N-oleoyl sarcosine	7.06	Benzotriazole	1.67	1 : 0.7
19	N-oleoyl sarcosine	7.53	Tolutriazole	2	1 : 0.7
20	N-oleoyl sarcosine	7.06	Triethanolamine	2.09	1 : 0.7
21	Oleic Acid	8.08	Triazole Derivative A	6.67	1 : 0.7
22	Lauric Acid	5.75	Triazole Derivative A	6.67	1 : 0.7

Table 3**Solubility Tests in Water and Naphthenic Oil**

Mixture of Example No.	Solubility (%)	
	Water*	Naphthenic Oil*
1	ca 0.5	ca 3.0
2	ca 0.5	ca 3.0
3	> 20	ca 2.5
4	> 20	ca 1.0
5	> 20	ca 0.5
6	> 20	ca 0.5
7	> 20	ca 0.5
8	> 20	> 10
9	> 20	> 1.0
10	> 20	> 1.0
11	> 20	ca 1.0
12	> 15	> 1.0
13	> 15	> 1.0
14	> 15	> 5.0
15	> 15	> 1.0
Comparative Example No.		
18	< 1.0	> 2.5
19	< 1.0	> 2.5
20	> 2.0	< 0.5
21	< 0.5	< 0.5
22	< 0.5	< 0.5

*** Solvents :**

Water = Laboratory Grade De-ionised Water
Naphthenic Oil = Nynas T 22 supplied by Nynas Naphthenics Ltd

Table 4**Solubility Tests in Additional Solvents**

Mixture of Example No.	Solubility (%)				
	Paraffinic Oil*	Gasoline*	Toluene*	PAG*	Ethylene Glycol*
2				> 1.0	
3		> 5.0		> 1.0	
6				> 1.0	
8	> 1.0	> 5.0	> 10	ca 3.0	> 5.0

***Solvents**

Paraffinic Oil = 100 Solvent Neutral Oil supplied by Mobil UK

Gasoline = Commercial 95 Octane Esso Unleaded Petrol

Toluene = 99% Laboratory Reagent Grade

PAG = Breox 50 A20 (RTM) supplied by Inspec UK Ltd

Ethylene Glycol Laboratory Reagent Grade Ethanediol

Table 5 **Corrosion Inhibitor/Metal Passivator Tests**

Product of Example No.	Fe Corrosion		Al Corrosion Coupon Test	Cu Passivation ASTM D 130 Test Rating	
	Coupon Test	IP 287 Test Breakpoint		Oil 1 *	Oil 2 *
Blank (no additive)	Severe corrosion/staining		Severe corrosion/staining	3b	3b
2	No corrosion/staining		No corrosion/staining		
3	No corrosion/staining	30 : 1	No corrosion/staining	1a	1a
6	No corrosion/staining		No corrosion/staining		
8	No corrosion/staining		No corrosion/staining		

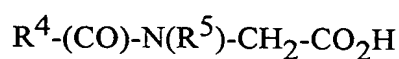
* Oil 1 = 100 Solvent Neutral Oil supplied by Mobil

* Oil 2 = 500 Solvent Neutral Oil supplied by Batoyle Freedom Group

Claims

1. A mixture comprising one or more compounds of type:

a) an organic hydrocarbon-soluble acyl amino acid derivative of the formula (III):



(III)

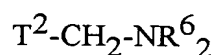
in which

R^4 is $C_8 - C_{30}$ straight or branched chain alkyl, optionally substituted by one or more aryl or alkenyl groups.

R^5 is hydrogen or methyl,

and one or more compounds of type:

b) a water-soluble N,N disubstituted aminomethyl triazole derivative of formula (IV):



(IV)

in which

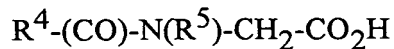
T^2 is a 1,2,3, benzotriazole group, optionally substituted by one or more alkyl groups, or a 1,2,4 triazole group.

R^6 is a hydroxyalkyl group containing from 1 - 4 carbon atoms and from 1 - 4 hydroxyl groups,

in such a ratio such that the resulting combination is soluble in both organic hydrocarbons and water.

2. A mixture as claimed in claim 1 comprising one or more compounds of type:

a) an organic hydrocarbon-soluble acyl amino acid derivative of the formula (III):



(III)

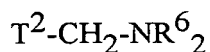
in which

R^4 is $C_8 - C_{30}$ straight or branched chain alkyl, optionally substituted by one or more aryl or alkenyl groups.

R^5 is hydrogen or methyl,

and one or more compounds of type:

b) a water-soluble N,N disubstituted aminomethyl benzotriazole of formula (IV):



(IV)

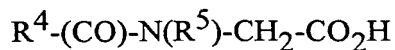
in which

T^2 is a 1,2,3, benzotriazole group, optionally substituted by one or more alkyl groups.

R^6 is a hydroxyalkyl group containing from 1 - 4 carbon atoms and 1 - 4 hydroxyl groups,

in such a ratio such that the resulting combination is soluble in both organic hydrocarbons and water.

3. A mixture as claimed in claim 1 or claim 2 where compound (III) is:



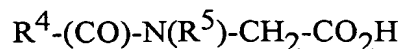
(III)

in which

R^4 is $C_{10} - C_{20}$ straight or branched chain alkyl, optionally substituted by one or more aryl or alkenyl groups.

R^5 is hydrogen or methyl.

4. A mixture as claimed in any one of claims 1 to 3 where compound (III) is:



(III)

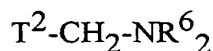
in which

R^4 is $C_{11} - C_{17}$ straight or branched chain alkyl, optionally substituted by one or more aryl or alkenyl groups.

R^5 is methyl.

5. A mixture as claimed in any one of claims 1 to 4 where compound (III) is N-lauroyl sarcosine or N-oleoyl sarcosine.

6. A mixture as claimed in any one of claims 1 to 5 where compound (IV) is:



(IV)

in which

T^2 is a benzotriazole or tolutriazole group

R^6 is 2-hydroxyethyl.

7. A mixture as claimed in any one of claims 1 to 6 wherein the mole ratio of compound (III) to compound (IV) is from 1 : 0.2 to 1 : 2.

8. A mixture as claimed in claim 7 wherein the mole ratio of compound (III) to compound (IV) is from 1 : 0.5 to 1 : 1.

9. A mixture as claimed in claim 7 or claim 8 wherein the mole ratio of compound (III) to compound (IV) is from 1 : 0.6 to 1 : 0.9.

10. A mixture as claimed in any one or more of claims 1 to 9 which comprises further additives.

11. A composition comprising a mixture as claimed in any one or more claims 1 to 10 and water.
12. A composition comprising a mixture as claimed in any one or more claims 1 to 10 and one or more organic hydrocarbons.
13. A composition comprising a mixture as claimed in any one or more claims 1 to 10 and water and one or more organic hydrocarbons.
14. A mixture as claimed in any one or more claims 1 to 10 or a composition as claimed in any one or more claims 11 to 13 in contact with a ferrous metal surface.
15. A mixture as claimed in any one or more claims 1 to 10 or a composition as claimed in any one or more claims 11 to 13 in contact with a non-ferrous metal surface.
16. A kit comprising compound (III) and compound (IV) as defined in any one of claims 1 to 6 in such a ratio that, when mixed together, the resulting combination is soluble in both water and organic hydrocarbons.
17. A process comprising mixing together a compound of formula (III) as defined in any one of claims 1 to 6 with a compound of formula (IV) as defined in any one of claims 1 to 6 in such a ratio that the mixture is soluble in organic hydrocarbons and soluble in water.
18. A process comprising mixing together a compound of formula (III) with a compound of formula (IV) to create a mixture or composition as defined in any of claims 1 to 15.
19. Use of a mixture as claimed in any one or more of claims 1 to 10 or a combination or a mixture as claimed in any one or more of claims 11 to 13 or a mixture as claimed in claim 14 or claim 15 as a corrosion inhibitor, metal deactivator, emulsifier or surfactant.
20. A mixture as herein described with reference to the examples.

Abstract

The present invention relates to corrosion-inhibiting and/or lubricant compositions comprising an organic hydrocarbon and/or water-based system containing an effective amount of a mixture of an acyl amino acid derivative and a triazole derivative. In particular ratios, the mixtures have solubility in both aqueous and non-aqueous solvents and in mixed systems, such as emulsions.

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